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INTEGRATED REPORTING OF MINING ENTERPRISES: BIBLIOMETRIC ANALYSIS

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Abstract:

This study uses a systematic review of the literature using the bibliometric method. Research methods – selection, bibliographic analysis, grouping and systematic content analysis of scientific publications. Content analysis or quantitative analysis of publications is the transformation of mass textual information into quantitative indicators. The search for information for bibliometric analysis was performed in two scientometric databases Scopus and Web of Science on the keyword “integrated reporting” in the period between 1990-2020. Based on the obtained data, bibliographic maps were formed using the VOSviewer research visualization and clustering analysis tool. The analysis revealed 308 publications in the Scopus database and 393 publications in the Web of Science database. The number of publications on integrated reporting has been growing dynamically in recent years, which confirms the scientific interest among scientists. The constructed bibliometric maps made it possible to visually identify the most used keywords and authors in the researched articles, which form separate scientific schools. The results of the analysis allowed to establish the current state of scientific research on the subject, to conduct a comparative analysis of bibliometric indicators, to identify areas of interest for authors, to explore issues and identify prospects for further development of integrated reporting as a source of information on environmental activities.

Key words: *integrated reporting, corporate social responsibility, sustainable development, bibliometric analysis*

1. Introduction

In today's economic environment, accompanied by globalization, the financial crisis, the spread of coronavirus (COVID-19), limited natural resources, environmental problems and climate change, there is a growing interest in non-financial disclosure. That is why integrated reporting is considered as a conglomeration of accounting and management reports provided to internal and external users for decision making. As a

result, integrated reporting should reflect information not only on the financial condition and performance of the enterprise, but also on environmental, social aspects and corporate governance.

The development and implementation of integrated reporting will, on the one hand, meet the interests of all groups of users of reporting, and on the other hand, provide information about the company's contribution to sustainable development as a whole.

In order to reach a consensus between economic development and the environment, the concept of sustainable development has been implemented, the provisions of which are based on inclusive development, taking into account the need to preserve the environment (Hyk, 2021). From an ecological point of view, sustainable development must ensure the integrity of biological and physical natural systems (Siryk et al., 2021).

The International Council on Mining and Metals (ICMM) was established in 2001 to improve the results of sustainable development in the mining and metallurgical industries. In 2013, the Council submitted a response to a document of the International Integrated Reporting Framework consultation project, in which it generally supported the introduction of integrated reporting. However, the lack of clear regulations, lack of training programs in this area and mentality suggest that the process of implementing integrated reporting is going through many difficult stages and with a long duration. Thus, despite the rapid development of integrated reporting today, insufficient attention is paid to the need for a systematic approach to the study of problems and the study of complex general theoretical principles of its construction.

2. Analysis of recent research and publications

A relatively small number of works by domestic and foreign scientists are devoted to the problems of forming the concept of integrated reporting of mining enterprises.

Thus, Hilson G., Murck B. (2000) considered the prospects of reporting on the sustainable development of mining enterprises. Jenkins H., Yakovleva N. (2006) studied the trends of disclosure of information about social and environmental responsibility in the reporting of the 10 largest mining corporations in the world. Perez F., Sanchez L. (2009) also studied the report on sustainable development of 4 large mining companies on a set of 62 indicators, grouped into 6 categories. Azapagic A. (2004) proposed a system of indicators of sustainable development exclusively for mining companies as a tool for assessing efficiency.

The work of Muduli K., Barve A. (2013) aims to develop a framework for sustainable development for Indian mining companies using the GSCM (green supply chain management) approach.

Fonseca A. (2010) studied the reliability of reports on the sustainable development of mining corporations and Fonseca A., McAllister M.L., Fitzpatrick P. (2014) subjected constructive criticism to the GRI (Global Reporting Initiative) approach.

Some attempts to develop a model of integrated reporting that will assess the impact of the enterprise on the state of natural resources and meet the information needs

of users made Zamula I., Prodanchuk M., Kovalchuk T., Kolesnikova O., Myhalkiv A. (2020).

Quite significant developments in the formation and presentation of non-financial reporting, reflection of information about the environmental activities of mining companies made by Polish scientists Wozniak J., Paktwa K. (2017, 2018, 2019).

However, without diminishing the value of the work of the above-mentioned scientists, it should be recognized that the issues of integrated reporting are accompanied by certain problems caused by imperfect regulations and require more thorough research from both theoretical and practical points of view.

One of the methods of evaluating the results of scientific research is bibliometric analysis. Bibliometrics is a discipline that uses mathematical and statistical methods to study the flow of scientific documents in order to identify trends in the subject areas, the peculiarities of authorship and the mutual influence of publications. Bibliometric analysis is considered an important and valuable method of evaluating a scientific publishing house (Ellegaard O., Wallin J. (2015) and bibliometric research becomes easier due to the widespread use of computer technology and the spread of access to the Internet (Merigo J.M., Yang J.-B. (2017). The VOSviewer (Visualizing Scientific Landscapes) platform is open source software for analyzing a bibliometric network. It allows you to work with text files that contain descriptions of bibliographic records that are exported from databases Scopus, Web of Science and others.

Selection of previously unsolved parts of the overall problem. The problematic issues of a comprehensive and systematic review of literature sources on integrated reporting and disclosure of information about the environmental activities of enterprises remain unresolved.

Formulation of the purpose of the article (problem statement). The purpose of the article is to conduct a bibliometric analysis of scientific publications on integrated reporting in scientometric databases Scopus and Web of Science for the period 1990-2020. In accordance with the goal formed a key task (research question) – what level of scientific interest is the study of integrated reporting by criteria: the total number of publications, the most commonly used keywords and citation index.

3. Methodology

This study uses a systematic review of the literature using the bibliometric method. The search for information for bibliometric analysis was carried out in several stages:

1) a search query was performed in two scientometric databases Scopus and Web of Science for the keyword “integrated reporting”. The scope of the study was narrowed to the following scientific areas: “Economics, Econometrics and Finance”, “Business, Management and Accounting” and the time period between 1990-2020.

The following parameters (filters) were set for searching in databases:

- in Scopus – TITLE-ABS-KEY (integrated AND reporting) AND (LIMIT-TO (SUBJAREA, “BUSI”)) AND (LIMIT-TO (PUBYEAR, 2020) OR LIMIT-TO (PUBYEAR, 1990)) AND (LIMIT - TO (SUBJAREA, “ECON”)).

- in Web of Science – TITLE: (integrated reporting) Refined by: WEB OF SCIENCE CATEGORIES: (BUSINESS FINANCE OR MANAGEMENT OR BUSINESS OR ECONOMICS) AND WEB OF SCIENCE CATEGORIES: (BUSINESS FINANCE OR MANAGEMENT OR BUSINESS OR ECONOMICS) Timespan: 1990- 2020 Indexes: SCI-EXPANDED, SSCI, A & HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, ESCI.

All obtained data were saved using the “Data Export” function in the respective scientometric databases Scopus and Web of Science.

2) formation of a bibliographic map based on data obtained from Scopus and Web of Science databases using universal software VOSviewer, designed to build and visualize bibliometric links.

4. Results and Discussion

The analysis of the period 1990-2020 revealed 308 publications in the Scopus database and 393 publications in the Web of Science database. In the table 1 shows the detailed number of publications depending on the type of document.

Table 1: Number of publications according to the type of document

Document type	Scopus		Web of Science	
	quantity	%	quantity	%
Article	213	69,2	300	66,1
Implementation	-	-	65	14,3
Book chapter	64	20,8	32	7,0
Book	19	6,2	3	0,7
Early publication	-	-	28	6,2
Editorial material	-	-	8	1,8
Review	10	3,2	7	1,5
Abstract	-	-	6	1,3
Book review	-	-	5	1,1
Conference Paper	2	0,6	-	-
Total	308	100,0	393	100,0

Source: formed by the authors on the basis of data obtained from the Scopus database and Web of Science.

For the analyzed period of publications in the database Scopus and Web of Science were presented the main hospitals and in the percentage of about one – 70%. However, the situation with other types of publications is somewhat different: 64 or 20,8% of book sections in the Scopus database were found, which is twice as many as in the Web of Science database 32 or 7,0%; the number of books in the Scopus database is 19, which is also significant than in the Web of Science database – 3; Early publications (articles available on the Internet before they are scheduled for publication) were found only in the Web of Science database and accounted for 28 or 6,2%. All abstracts see publications in the percentage of no more than 5% of the total.

To conduct a quantitative analysis of publications, graphs with their dynamics over the years were constructed (Fig. 1).

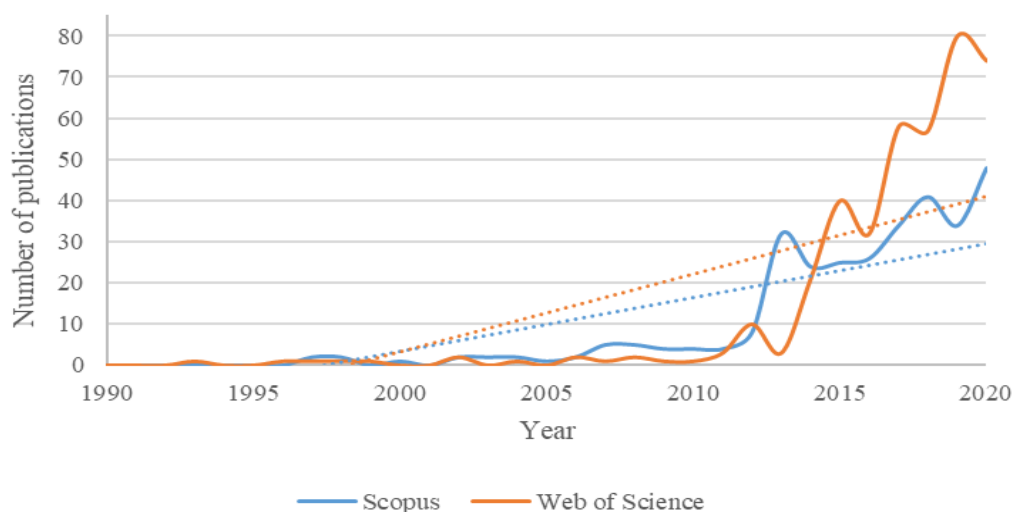


Figure 1: Dynamics of the number of publications on the topic of integrated reporting in scientometric databases Scopus and Web of Science for the period 1990-2020

Source: formed by the authors on the basis of data obtained from Scopus and Web of Science databases.

From fig. 1 shows that the number of publications on integrated reporting during the study period is growing every year, which indicates scientific interest among scientists.

According to the built trend lines on the scientometric databases Scopus and Web of Science, there has been a sharp increase in published works on this topic since 2014, thanks to the active work of scientists in many countries. This is primarily due to the fact that in 2014, at the plenary session of the XIX World Congress of Accountants, the International Council on Integrated Reporting approved the gradual adoption of the International Framework for Integrated Reporting over the next three years and caused public discussion. The relatively low publication activity until 2014, in our opinion, is due to the fact that this long period is characterized by the process of modifying the concept of corporate social responsibility and the formation (emergence) of a new form of integrated reporting. Nevertheless, it was during this period that the first attempts to prepare and submit integrated reports took place. Thus, the mining and metallurgical group of companies Metinvest, DTEK and SCM was one of the first in Ukraine to prepare a report on sustainable development, which was prepared in accordance with the international standard GRI (Global Reporting Initiative). In the company's reports, special attention was paid to environmental issues, emissions of pollutants, environmental costs.

In 2017, Directive 2013-34/GI came into force in the EU, according to which corporate enterprises with more than 500 employees are required to submit informal reports disclosing environmental, social aspects, human rights, anti-corruption and bribery, information on corporate governance and more. This year, Ukraine also introduced at the legislative level the submission of "Management Report" to public interest entities (large enterprises, financial institutions) and medium-sized enterprises with certain characteristics. Thus, the concept of integrated reporting is currently being gradually introduced into the practice of mining enterprises, but this process has not yet become

widespread due to the existence of problems of theoretical, methodological and organizational nature, to which scientists in recent years focus their efforts.

To establish the frequency of use of the term integrated reporting, together with other words, a keyword analysis was performed. For this purpose, a bibliometric map of keywords in the studied articles for the period 1990-2020 was constructed (Fig. 2).

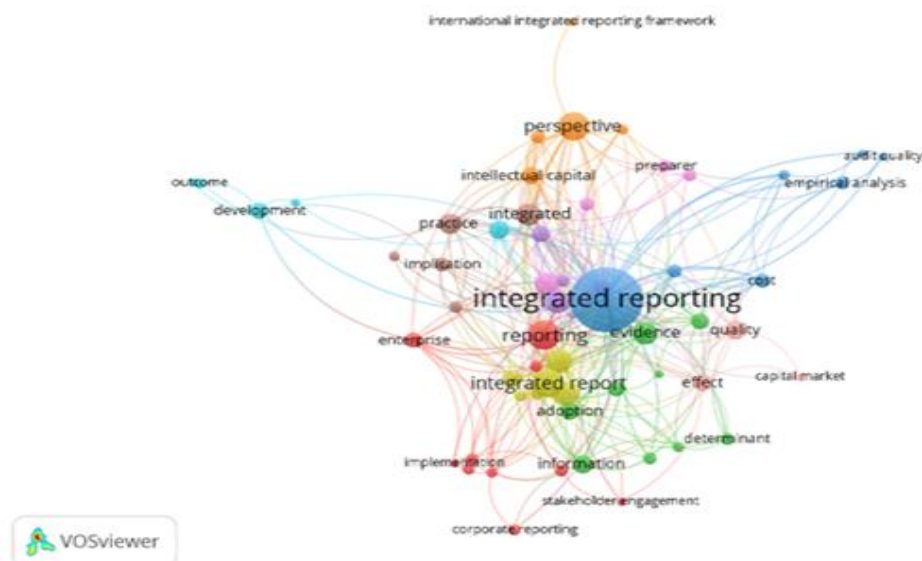


Figure 2: Bibliometric map of keywords in the studied articles (1990-2020)

Source: formed by the authors based on VOSviewer (2020).

The size of the keyword on the network indicates the frequency of use, and the same color and proximity emphasize the high connection. Each keyword in the network forms a node, and the connection between the nodes forms an edge. Keyword analysis created using keywords in the field of integrated reporting used “association” as a method of normalization and Leuven's algorithm as a method of clustering. After analyzing the clusters, it was found that the element of influence in the blue cluster was the word “integrated reporting”, “reporting” was dominant in the red cluster and the term “integrated report” was observed in the pistachio cluster. According to the obtained data, the 10 most used keywords by the authors in the publications were identified (Table 2).

Table 2: Frequency of keyword use by authors within this request

Keyword	Number of cases	Keyword	Number of cases
Integrated reporting	169	Evidence	26
Reporting	46	Report	24
Integrated report	36	Quality	20
Disclosure of information	34	Stability	20
Prospect	31	Intellectual capital	13

Source: formed by the authors on the basis of data obtained from the Web of Science database.

To establish the largest number of publications among scientists on the subject of the study, the data are grouped, which are given in table 3.

Table 3: The number of publications of authors within this query

Scopus		Web of Science	
Author	Number of publications	Author	Number of publications
Maroun W.	9	Maroun W.	15
Busco C.	6	Raimo N.	13
Granà F.	6	Vitolla F.	13
De Villiers C.	5	Rubino M.	12
Atkins J.	4	Dumay J.	11
Dumay J.	4	De Villiers C.	10
Higgins C.	4	Dumitru M.	9
James M.	4	Melloni G.	8

Source: formed by the authors on the basis of data obtained from Scopus and Web of Science databases.

The analysis found that the largest number of citations from the two scientometric databases Scopus and Web of Science were made at work: Warren Maroun (Atkins J., Maroun W. (2015) – professor at the University of the Witwatersrand in Johannesburg (South Africa); Charl de Villiers (De Villiers C., Rinaldi L., Unerman J. (2014) is a professor at the University of Auckland in New Zealand; John Dumay (Dumay J., Bernardi C., Guthrie J., Demartini P. (2016) is an associate professor at Macquarie University in Sydney, Australia.

Based on the obtained data, a bibliometric map of the authors in the studied articles for the period 1990-2020 was constructed (Fig. 3).

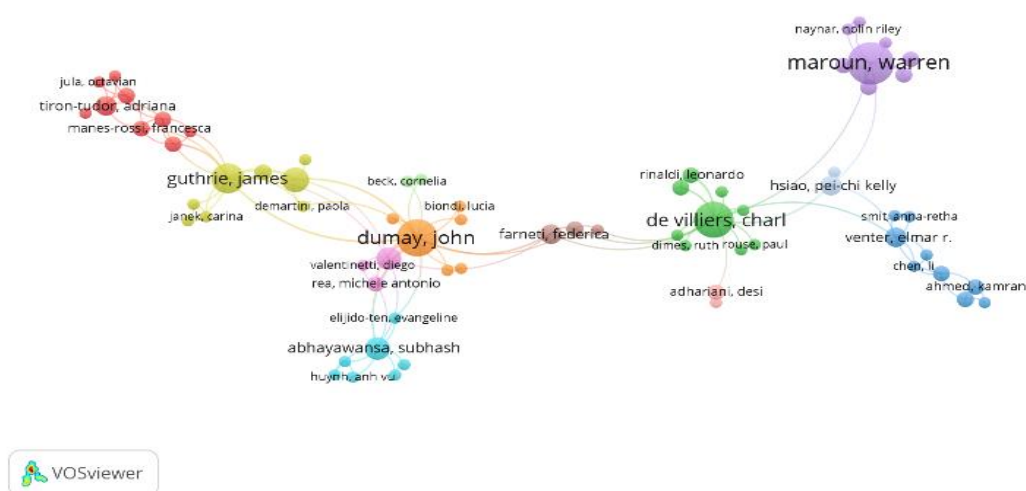


Figure 3: Bibliometric map of the authors in the studied articles (1990-2020)

Source: formed by the authors based on VOSviewer (2020).

Each node represents the author, and its size indicates the number of citations. The relationship between the two nodes indicates the relationship of joint citation. Each link has a strength and the higher it is, the greater the thickness of the link. Nodes are also grouped by similarity. Cluster analysis suggests that the above-mentioned 3 accountants Warren Maroon (h-index = 15), Charles de Ville (h-index = 25) and John Dumay (h-index = 35) have a significant influence on this topic and form the largest clusters, which characterizes their scientific contribution.

5. Conclusions

In this study, a review of the literature using a bibliometric method. The selection was conducted in the two most well-known databases Scopus and Web of Science on the keyword integrated reporting in the period 1990-2020. The selection resulted in 308 publications in the Scopus database and 393 publications in the Web of Science database, among which were mainly observed scientific articles. The dynamics of the number of studies on this topic over the past decade has increased significantly. This indicates that the issue of integrated reporting continues to be attractive in the global scientific arena. Moreover, radical changes in the reporting system maintain and increase the importance of this topic every year.

As a result of the analysis and formation of a bibliometric map by keywords, it was found that common terms are: integrated reporting, reporting, integrated report, information disclosure and perspective, which are the largest clusters.

In the study on the bibliometric map of the authors found that the greatest publishing activity among scientists on the subject was made by Warren Maroun, Charles de Villiers and John Dumay.

Therefore, the results obtained can serve as a fundamental source for future research. The study reflects growing trends in the field of integrated reporting and provides insight to scientists for further development. In addition, the research helps to create a conceptual framework, is a source for scientists to conduct new research by assessing gaps and provides opportunities for comparison. Further research will focus on analyzing and evaluating the qualitative content of articles.

6. Acknowledgements

This study was conducted within 2 scientific topics: "Accounting in the context of sustainable economic development" (code of R&D work – OA-16) and "Formation and distribution of information flows between the subjects of the accounting system of the enterprise" (code of R&D work – OA-20).

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